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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEE, PING

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/277,013

Applicant(s)

BAUCK, JERALD L.

Examiner

Ping Lee

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 11-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cooper et al (US 5,333,200).

Cooper et al (hereafter Cooper) discloses, Fig. 10b in view of Figs. 10A,a8b and 1c, the method of substantially recreating a binaural impression of a sound perceived by a first listener from an audio source for a plurality of other listeners comprising the steps of determining a first transfer function matrix (Fig. 8b); determining a second transfer function matrix (Fig. 1c); solving for a transfer function matrix (Fig. 10b); processing an input audio signal (as shown input at the top of the circuit) and supplying the processed audio signal to a set of speakers (col. 18, line 55).

Regarding claims 11-13, Cooper fails to explicitly show the plurality of other listeners at locations different from the location of the first listener. Cooper teaches a method for recreating the binaural impression for a single listener in a location that is different from the location of the first listener. Based Cooper's disclosure, the transfer functions A and S are functions depending on the location, which could be varied, of the single listener. The transfer functions A and S are functions for the particular single listener in the particular location. For additional listener(s), one skilled in the art would have expected that a different set of transfer functions A and S should be used

depending on the location(s) of the additional listener(s). Furthermore, Cooper suggests that the reformatter is being used for the speakers on a TV. A TV in a family could be used for more than one listeners. Thus, it would have been obvious to one of ordinary skill in the art to modify Cooper's method by implementing this method for more than one other listener at locations different from the first listener's in order to allow more than one listener to recreate the same binaural impression for the first listener.

Regarding claims 14-18, Cooper shows the stereo input (Fig. 10A), the plurality of speakers at $\pm 30^\circ$, the cross talk cancellation (col. 8, lines 15-49).

Regarding claim 19, Cooper shows that head simulation is for convert signals intended for a specific loudspeaker bearing angle, say $\pm 30^\circ$, therefore, the claimed limitation "conceptual or simulated space" is met.

Regarding claims 20 and 21, Cooper shows the method of recreating an acoustic perception of a listener in a first space (space with loudspeakers at $\pm 30^\circ$) for a listener in a second space (space with loudspeakers at $\pm 15^\circ$) in Fig. 15. Although Fig. 15 fails to explicitly show the signals to be applied to each speaker, in view of the disclosure of col. 18-19 in combination Fig. 15, in view of Figs. 10a, 10b, 8b and 1c, one skilled in the art would be able to determining a second matrix of transfer functions (Fig. 8b); determining a first matrix of transfer functions (col. 18, line 65); determining a fourth matrix of transfer function (Figs. 10a and 10b) using the first, second and third matrices; processing an input audio signal and supplying the processed audio signal to a set of speakers (col. 18, line 55), in order to reformat the input signals (Ls,Rs; col. 18, lines

60-63) to recreate sources at a location (the example provided by Cooper is $\pm 50^\circ$) other than the location of the speakers for the first listener.

Regarding claim 22, Cooper shows the product of two matrices (comparing Fig. 10b with Fig. 10a).

Regarding claim 23, Cooper shows the sum or difference of two matrices (col. 22, lines 3-56).

Regarding claim 24, Cooper shows the realizable and stable filter elements (Figs. 6 and 7) for the embodiment shown in Fig. 1c. Although Cooper fails to explicitly show how to use those elements for the embodiment shown in Fig. 15, Fig. 15 nevertheless is the modification of several embodiments including the one shown in Fig. 1c. Therefore, one skilled in the art would be able to implement a part of the fourth matrix using realizable and stable filter elements as suggested in Fig. 1c without any undue experience.

Regarding claims 25 and 27-30, Cooper shows that method of recreating one or more acoustic perception of a single listener in a first space for more than one listener in a second space (Fig. 10s), but fails to show there is more than one listener in a first space. Cooper teaches on col. 18, lines 59-68 that the loudspeakers in the first space could be mounted at $\pm 30^\circ$. However, this is merely an example. The loudspeakers in the first space could be mounted in other reasonable orientations. By fixing the filters in 402 of Fig. 10a in a particular orientation, one skilled in the art would have expected that Cooper's reformatter would be limited to only one orientation. By measuring several set of transfer functions for a listener in the first space at plurality of speaker orientations

and allow the user to select the speaker orientation in the first space to be recreate, one skilled in the art would have expected that the listener in the second space could have more freedom of selecting the perception to be recreated.

Based Cooper's disclosure, the transfer functions A and S are functions depending on the location in the second space, which could be varied, of the single listener in the second space. The transfer functions A and S are functions for the particular single listener in the particular location in the second space. For additional listener(s), one skilled in the art would have expected that a different set of transfer functions A and S should be used depending on the location(s) of the additional listener(s). Furthermore, Cooper suggests that the reformatter is being used for the speakers on a TV. A TV in a family could be used for more than one listeners.

Thus, it would have been obvious to one of ordinary skill in the art to modify Cooper's method by determine the second matrix of transfer functions for each listener among plurality of listeners in the first space with speakers in the first space mounting in different orientation in order to allow the listener in the second space to perceive one or more perceptions of a listener in the first space.

Regarding claim 26, Cooper shows the first space and second space are anechoic space.

Response to Arguments

3. Applicant's arguments filed 1/13/05 have been fully considered but they are not persuasive.

Applicant argued, on p. 12 and 14 that Cooper fails to present the recreated binaural impression to a plurality of listeners.

It is noted that Cooper teaches, for example in Fig. 10a, how to recreate the spatial impression of the sound reproduced from speakers in $\pm 30^\circ$ for a second listener in a second space from second set of speakers in $\pm 15^\circ$. Claims 20-24 specify a listener in a second space. Claims 27-30 specify one or more listeners in a second space. Thus, Cooper's invention clearly teaches the claimed limitation. Cooper teaches the same location for the listener in the second setting, but never teaches that the second listener has to be the same listener. Cooper teaches, for example, that the second set of speakers could be the mounted on television. Television, as one would have expected, is a viewing device intended for a plurality of listeners. For example, one member of the family watches some TV program in the morning and another member of the family watches some TV program in the afternoon. Furthermore, claims 11-19, 25 and 26 never specify that a plurality of listeners be presented at the same time.

Applicant argued on p.13 that Cooper fails to show how to solve for a transfer function matrix.

Any mathematic equation is used to solve an unknown regardless the unknown is a sum, a difference, a product, a part of a product or the combination. Therefore, Cooper shows how to solve the transfer function matrix.

Applicant argued on p. 15 that Cooper's disclosure is incomplete and it merely mentions "a plurality of speakers" and "crosstalk cancellation".

One simply cannot attack a reference without giving any detail explanation for each and every difference. Cooper's disclosure teaches many embodiments of recreating binaural sound effect for a second listener in a second space different from a listener in a first space. Any one study it intensively will recognize that Cooper's disclosure is substantially more than mentioning "stereo input". In order to recreate the binaural sound effect for a second listener from "a plurality of speakers", **crosstalk** has to be **canceled**. In the simplest form, Fig. 1B of Cooper teaches the basic concept of crosstalk from one speaker to ear on the other side of the head. For more complex embodiments, Cooper does not illustrate the paths. However, one skilled in the art would understand that crosstalk exists and it needs to be canceled for loudspeaker generation (headphone does not require crosstalk cancellation because there is no crosstalk from left side of the speaker to the right ear).

Applicant argued on numerous occasions that Cooper cannot anticipate the invention.

Examiner would like to point out that the invention was rejected under 103 rejection, not 102 rejection. Therefore, applicant's argument is moot.

Applicant argued that claims 20 and 21 should not be rejected in view of Fig. 15 of Cooper.

It appears that applicant misunderstood the rejection. Claims 20 and 21 specify the second space having more than three speakers. Fig. 15 of Cooper shows the embodiment having more than three speakers in the second space. However, Fig. 15 fails to provide the detail on how to derive the transfer function for each speaker. Based

on the discussion for Fig. 15 on col. 21, Cooper teaches that this embodiment is based on the embodiment shown in Fig. 14, which is based on the embodiment shown in Figs. 1c, 12 and 13. One has to understand the embodiments shown in Figs. 10a, 10b, 8b and 1c in order to understand Figs. 12 and 13. The claimed third matrix transfer function reads on the shown transfer functions in Fig. 15 from speakers 632 and 634 to the left and right ears of the listener, and other transfer function not shown from speakers 636 and 638 to the same listener.

Applicant argued that Cooper fails to show the sum or difference of two matrices for claim 23.

On col. 22, Cooper teaches an example of deriving transfer function using matrix algebra. As stated on p. 3 of the specification, matrix multiplication means repeated additions. Therefore, Cooper teaches sum of two matrices in one embodiment.

Applicant argued that Cooper fails to show realizable and stable elements.

Cooper teaches the realizable and stable elements in Fig. 7.

Applicant argued that Cooper fails to show recreating one or more acoustic perception of listeners in a first space.

Cooper gives a basic and simple example of recreating acoustic perception of a listener in a first space with speakers mounted at $\pm 30^\circ$. However, this is merely an example. With many possible speakers orientations, one simply would not limit or fix the filters for simulating the speakers mounted only at $\pm 30^\circ$. Cooper teaches how to recreate perception speakers mounted at $\pm 30^\circ$ in the first space. One skilled in the art

would be able to determine the filter for other orientations without any undue experience.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 703-305-4865. The examiner can normally be reached on Monday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N. Tran can be reached on 703-305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2644

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ping Lee
Primary Examiner
Art Unit 2644

pwl